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Influence of the Imbrium impact event on textures and chronometry of impact melt breccia 15455

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The processes of resetting of U-Pb chronometers, notably zircon, during basin-forming lunar impacts remain poorly understood. Apollo 15 impactite 15455 has been studied previously using a range of chronometers (Rb-Sr, Sm-Nd, Ar-Ar, U-Pb), which revealed a multi-stage impact history. In situ petrological work on thin sections displays shocked norite lithologies crosscut by presumably Imbrium-derived impact melt. Irregularly distributed SiO₂-diopside aggregates in the norite contain zircon, baddeleyite, apatite and whitlockite. The aggregates (< 0.3 mm) may have formed from primary trapped differentiated melt or may have formed from shock-induced remelting of such lithologies. Some of these aggregates occur adjacent to the impact melt and likely were exposed to high temperatures, possibly capable of resetting some of the chronometer minerals. Future study of in-situ U-Pb ages will allow to 1) compare in situ data with existing age data for 15455 to better understand the influence of heating or shock events in the petrologic context 2) investigate the influence of thermal resetting as a function of proximity to the impact melt.

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